

Late outcomes of laparoscopic pyeloplasty: a single institution study with follow-up longer than 5 years

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Abstract

Introduction: Although most urologists agree that failures after laparoscopic pyeloplasty occur usually within a year after the operation, late failures are also reported.

Aim: To assess late results of laparoscopic pyeloplasty.

Material and methods: Seventy-eight of ninety-five patients who had been operated on between November 2001 and September 2009 were notified about the possibility of diuretic renography (DR). Excluded from the study were 3 patients who failed within 1 year after surgery, 2 others with late recurrences at 1.5 and 2.5 years postoperatively, 8 patients who were lost to follow-up immediately after the operation, 2 patients with equivocal DR after pyeloplasty and 2 cases with open conversion. Twenty-six (33.3%) patients responded to the notification. Mean follow-up was 89 months. In all patients DR, ultrasound, serum creatinine concentration, estimated glomerular filtration rate and the assessment of symptoms were carried out. Success was defined as $T_{1/2} \leq 12$ min and improved or stable differential renal function on DR.

Results: Diuretic renography revealed no obstruction in 25/26 (96%) patients. One woman was not appropriately hydrated, which rendered the result of the investigation unreliable. Mean half time to tracer clearance was 6.74 min. Mean split renal function on the operated side was 44.62%. Mean pain strength according to the VAS scale was 1.54.

Conclusions: Our study seems to indicate that recurrence after laparoscopic pyeloplasty in the follow-up period longer than 5 years is very unlikely. However, until more data are available, patients should undergo long-term follow-up to receive the benefit of the operation.

Key words: laparoscopic pyeloplasty, results, long-term follow-up.

Introduction

In the last 20 years, laparoscopic pyeloplasty has become the gold standard in the treatment of ureteropelvic junction obstruction (UPJO). The procedure has gained popularity because of early functional recovery, less pain in the postoperative period, good cosmesis and a high short-term success rate, which is com-

parable to open pyeloplasty [1]. However, some authors point out that the length of the follow-up may considerably affect the evaluation of the therapeutic effects [2]. Although most urologists agree that failures after laparoscopic pyeloplasty occur usually within a year after the operation, late failures are also reported [3–5]. Hence, it is unclear what follow-up period would be sufficient to declare that the patient is cured.

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Aim

The aim of this study is to assess late results of laparoscopic pyeloplasty in patients with follow-up longer than 5 years. To the best of our knowledge, we present a cohort of patients with the longest mean follow-up time after laparoscopic pyeloplasty in the current body of literature.

Material and methods

Seventy-eight from ninety-five patients who had been operated on between November 2001 and September 2009 were notified about the possibility of diuretic renography. We excluded from the study 3 patients who failed within 1 year after surgery and 2 others with late recurrences at 1.5 and 2.5 years postoperatively. Eight patients who were lost to follow-up immediately after the operation, 2 patients with equivocal diuretic renography after pyeloplasty (T1/2 at the first postoperative visit between 12 min and 20 min), and 2 cases with open conversion were also excluded.

In all patients UPJO was diagnosed on the basis of ultrasound examination (US), diuretic renography (DR) and/or intravenous urography (IVU). A four-grade scale was used to estimate the degree of hydronephrosis [6]. A visual analog pain scale (VAS) was used to determine the severity of pain. Clinically significant obstruction on IVU was defined as not visible or narrowed ureteropelvic junction (UPJ) with hydronephrosis on the affected side. The upper limit of the half time to tracer clearance on DR (T1/2) for nonobstructed systems, according to the F+20 protocol, was 12 min. T1/2 for obstructed systems was over 20 min. Values between 12 min and 20 min were regarded as equivocal.

All patients underwent transperitoneal laparoscopic pyeloplasty using four ports. The authors have presented the operative technique they used for dismembered and nondismembered pyeloplasties in previous reports [7, 8]. Success was defined as 80% or greater pain relief according to the VAS, significant reduction of hydronephrosis and patent UPJ on IVU and/or T1/2 \leq 12 min and improved or stable differential renal function on DR.

In the follow-up protocol, US and the assessment of symptoms (analog pain scale) were carried out every 3 months during the first 25 months after the operation. Intravenous urography and/or DR were performed 4, 13 and 25 months after

surgery. Then a yearly visit to a urologist was recommended.

Twenty-six from 78 (33.3%) patients responded to the notification about the possibility of diuretic renography. Mean follow-up for them was 89 months (7.4 years), ranging from 61 months to 132 months. The group consisted of 16 (62%) women and 10 (38%) men. Nineteen (73%) patients underwent laparoscopic Anderson-Hynes pyeloplasty, 6 (23%) had laparoscopic Y-V pyeloplasty and in 1 case (4%) laparoscopic Fenger pyeloplasty was performed. Patients' average age on the operation day was 32.4 years (range: 16–56 years) and on the control day 39.3 (range: 21–64). In 14 cases the left side was operated on and in 12 it was the right side. There were no intraoperative complications. During the operation we found crossing vessels in 12 (46%) patients. Associated nonobstructing renal stones were found in 5 patients. In 4 cases the stones were grasped and removed after opening the renal pelvis. In 1 patient it was not possible to remove the stone from the lower calyx. At that time we did not have a flexible nephroscope and a holmium laser. Thus the decision was made to leave the stone. In this patient extracorporeal shock-wave lithotripsy (SWL) was successfully performed 6 months after the operation. The patients' data are reported in Table I.

Mean operative time was 194 min. In the immediate postoperative period we observed complications in 9 (34.6%) patients. Fever occurred in four patients (Clavien I), obstruction of a D-J catheter was diagnosed in 2 cases, and the D-J catheter slipped out in two patients (Clavien IIIa). One woman developed peritonitis 8 days after the procedure (Clavien IIIb).

In all patients diuretic renography (according to the F+20 protocol), US, laboratory tests (serum creatinine concentration, eGFR) and the assessment of symptoms (analog pain scale) were carried out.

Results

Diuretic renography revealed no obstruction in 25/26 (96%) patients (T1/2 \leq 12 min). One woman was not sufficiently prepared for the examination (not appropriate hydration), which rendered the result of the investigation unreliable. The scintigraphy was not repeated, because the patient, who was pain free, refused to undergo the additional investigation.

Mean half time to tracer clearance (T 1/2) was 6.74 min. Mean split renal function on the operated side was 44.62%. Long-term results of laparoscopic pyeloplasty are presented in Table II.

Ultrasound examination revealed dilatation of the pelvicaliceal system in 18 (69%) patients. Mean anteroposterior diameter of the renal pelvis was 20.6 mm. However, US did not correlate with the patients' clinical condition or results of diuretic renography. The subjective assessment of the procedure was very satisfactory. Twenty-five (96%) patients claimed to be satisfied with the results obtained. Mean pain strength after surgery according to the VAS scale was 1.54, whereas before the procedure it was 7.38. Laboratory tests (serum creatinine concentration, eGFR) revealed good renal function without any evidence of renal insufficiency.

Discussion

Laparoscopic pyeloplasty combines the effectiveness of open surgery with the advantages of minimally invasive procedures. The success rate of the operation in most major (> 150 cases) series exceeds 94%. In these studies researchers base their analysis on follow-ups lasting on average 12–39 months [9–13]. Bearing in mind that most recurrences occur within 12 months after surgery, some urologists advocate not to follow up patients with complete disappearance of hydronephrosis longer than 2 years [14].

In the analyzed group of patients persistent dilatation of the pelvicaliceal system was observed in nearly 70% of patients. It seems that the degree of dilatation in the postoperative period depends mainly on the preoperative pelvicaliceal appearance. Neste *et al.* report that ultrasonography they performed after pyeloplasty indicated a 50% decrease of hydronephrosis within 6 months after the surgery. After 7 months the anteroposterior diameter of the renal pelvis was 1.4 cm. Within a year after the operation, reduction of hydronephrosis, though not resolution, was observed in 72% of patients [15]. Urography showed similar findings. Cherrie and Kufman found normal caliceal appearance on the urogram performed between 2 months and 7 years after the operation only in 25% of patients. In 40% of cases reduction of pelvicaliceal dilatation was observed, in 30% no improvement was noted, and in 5% pelvicaliceal dilatation was found to have increased

Table I. Perioperative patients' data

Parameter	Results
Mean age, range [years]	32.4 (16–56)
Gender, n (%):	
Male	10 (38)
Female	16 (62)
Side, n (%):	
Left	14 (54)
Right	12 (46)
Concomitant nephrolithiasis, n (%):	
Yes	5 (19)
No	21 (81)
Patients according to degree of hydronephrosis, n (%):	
1–2	15 (58)
3–4	11 (42)
Crossing vessel, n (%):	
Yes	12 (46)
No	14 (54)
Type of pyeloplasty, n (%):	
Anderson-Hynes	19 (73)
Y-V	6 (23)
Fenger	1 (4)
Mean VAS score (range)	7.38 (0–10)

in relation to the pre-operative condition [16]. Williams and Kenawi maintain that in children, within 6 months after pyeloplasty, the caliceal appearance on the postoperative urogram was normal in 10% of cases, showed diminution of hydronephrosis in 55%, was unchanged in 34%, and deteriorated in 1% [17]. The above data seem to suggest that pelvicaliceal dilatation does not usually return to normal after surgery. Pyeloplasty is considered successful if urography or diuretic renography reveals effective drainage of urine from the kidneys. Thus the effectiveness of the procedure is not necessarily correlated with improved or normal caliceal appearance.

Data in the literature of long-term results of laparoscopic pyeloplasty are scarce, yet there are reports which indicate that the long-term durability of UPJ repair is not guaranteed. The findings of the

Table II. Results of laparoscopic pyeloplasty in patients with follow-up longer than 5 years

No. of patients treated ^a	No. of patients excluded from study ^b	No. of patients enrolled in study ^c (%)	Mean follow-up [months/years]	Failures (no. of patients)	Equivocal ^d (no. of patients)	Success (no. of patients)
95	17	26/78 (33.3%)	89/7.4	0	1	25

No. patients – number of patients. ^aPatients who underwent laparoscopic pyeloplasty between November 2001 and September 2009. ^bPatients to whom the notification was not sent: 3 who failed within 1 year after surgery, 2 with late recurrences at 1.5 and 2.5 years postoperatively, 8 who were lost to follow-up immediately after the operation, 2 with equivocal diuretic renography after pyeloplasty, 2 with open conversion. ^cPatients who responded to the notification and underwent diuretic renography. ^dUnreliable results of diuretic renography due to inappropriate hydration.

Mayo Clinic study based on open and laparoscopic pyeloplasties indicate that the recurrence-free survival rate after the operation diminished from 85% to 75% over a period of 7 years [2]. Rabi *et al.* report 3 patients who appeared to be cured at initial follow-up and presented with late recurrences, at 2, 2.5, and 6 years postoperatively [5]. Late failures make it difficult to establish the optimal duration of the follow-up period after pyeloplasty. A retrospective analysis of our databases revealed 2 cases with recurrences that were recognized more than 1 year after the operation (at 1.5 and 2.5 years postoperatively). It should be emphasized that we did not observe any failures in patients monitored longer than 5 years, which might suggest no need for further follow-up. However, our study had some limitations. The analyzed group was relatively small, which could have affected the power of the study. Yet, it seems to be difficult to collect a large series of patients with long-term follow-up, operated on in one center by a limited number of experienced surgeons. Multicenter studies could help to increase the cohort of patients, but in such trials differences in inclusion criteria, operative techniques and surgeons' experience should be considered. We cannot exclude that in some of our patients who were lost to long-term follow-up recurrence might have occurred and they were treated somewhere else. For some others, recurrence might have been pain-free and hence the patients were not followed up.

Taking into account that our study was retrospective and based on a relatively small group of patients, the results are tentative rather than conclusive. Even though our data suggest that recurrence after 5 years is not very likely, it cannot be entirely excluded, as indicated by other authors [2, 5].

Conclusions

Our study seems to indicate that recurrence after laparoscopic pyeloplasty in a follow-up period longer

than 5 years is very unlikely. However, until more data are available, patients should undergo long-term follow-up to receive the benefit of the operation.

Conflict of interest

The authors declare no conflict of interest.

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